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PLASTICS & MOLDED PRODUCTS

Reg. U. S. Pat. Off.

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❖ Contents ❖

THE IMPORTANCE OF SAFETY GLASS	307
<i>By R. C. Gilmore, Jr.</i>	
ARE YOU GOING UP?	309
<i>By Allan Brown</i>	
NEW APPLICATIONS OF SYNTHETIC PLASTICS	310, 311
STYLING THE TOILET SET	312
<i>By F. J. Byrne</i>	
PHYSICAL PROPERTIES OF FORMALDEHYDE	313
<i>By Dr. Frederick Walker</i>	
AN INEXPENSIVE SOURCE OF PEARL LUSTRE	317
NEWS OF THE INDUSTRY	318
TECHNICAL ABSTRACT SECTION	326
AND NOW IN CLOSING	334

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PLASTICS & MOLDED PRODUCTS

Reg. U. S. Pat. Off.

Volume 8

AUGUST, 1932

Number 8

The Importance of Safety Glass

By R. C. Gilmore, Jr.

Plastics Publications, Inc.

IN the last two or three years, a great deal of emphasis has been laid on the importance of safety glass as an outlet for pyroxylin sheeting. While no one has given definite facts to prove that this outlet is as important as it is claimed to be, nevertheless, the feeling still exists that it is a major market, consuming about half of the total pyroxylin production.

It is true that the producers regard safety glass as a major market, for it consumes a high quality, fairly expensive grade of sheeting. Then, too, its importance is largely in proportion to the sales of automobiles. But, important as it may be, this market only consumes about one-sixth of the sheeting production.

Aim of Report

In order to give our readers a comprehensive picture of the situation, the writer conducted an extensive survey and analysis of the field. This article is the result of that effort. It incorporates all the data collected, presenting what we believe is an accurate picture of the situation, and its conclusions have been largely corroborated by executives in the producing and consuming fields. It must be remembered that there are sev-

eral sources which have more complete data, such as the Plate Glass Manufacturers Association and the Pyroxylin Plastics Manufacturing Association, but that their figures are privately collected and are not available to the public.

Study of Imports

The total domestic production of pyroxylin sheeting for 1931 was reported at 11,836,000 pounds. In addition, 85,646 pounds were imported during the year. To take the last figure first, since it is more easily disposed of, the Government does not segregate safety glass stock from the general sheeting heading, although it does have a broad classification (No. 82,520) representing imports of transparent sheets more than 3/1000 of an inch in thickness and not more than 32/1000 thick. Safety glass stock is not only clear, transparent material, but is definitely limited in size, being 20/1000 of an inch thick and in sheets of 20 by 50 inches. One sheet weighs a pound, and there are almost exactly seven square feet to a sheet.

Our first duty, therefore, is to examine Government import sheets and to segregate this class of material: to examine duty slips, ports of entry and

countries of origin. Before doing this, we must know something of the buying habits of the larger customers and even more about the manufacturing facilities of foreign producers. We finally obtain a figure of 57,366 pounds valued at \$43,544, which represents the 1931 importation of safety glass stock. This is at an average price of \$.76 per pound, which would be low for the domestic product but is representative in the case of the poorer quality imported material.

Present Producers

Importation figures are apt to take sudden changes. For instance, in 1929, the Ford Motor Company imported about 40% of their requirements. What were those requirements that year? If one looks at the Tariff Readjustment Hearings and the testimony of Mr. R. H. McCarroll of Ford, he will see that that company was using 3,850 pounds daily, which, for a working year of 250 days, placed the Ford consumption at 962,500 pounds.

Before proceeding to an analysis of the domestic market, let us look for a moment at the producers of safety glass itself. At one time, a few years ago, the following companies were in the

field:

Triplex Safety Glass Company of North America, Inc.

Libbey-Owens-Ford Glass Co.
Pittsburgh Plate Glass Company (DuPlate Corporation)
Safe-tee Glass Corporation
Indestructo Glass Company

At present, however, the last two named are doing a small proportion of the total business and Triplex is not a producer. It was bought on January 16, 1932 by Libbey-Owens-Ford, who in turn sold the Clifton, New Jersey, plant to Pittsburgh Plate Glass, arranging to license it under Triplex patents. The two companies also agreed to share the Ford Motor business. In June, 1931, Libbey-Owens-Ford also bought the Ottawa, Illinois, plant of the National Plate Glass Company from General Motors, which contracted with Libbey-Owens-Ford for all of its glass for a period of seven years, a contract reputed to be worth \$50,000,000. It is therefore apparent that Libbey-Owens-Ford has a virtual monopoly of the safety glass industry, certainly insofar as the automobile industry is concerned. It has a present retail price of \$3.00 per square foot for plate safety glass and \$2.15 for sheet. Other prices have been found elsewhere ranging from \$.50 to \$1.25 per square foot.

Important Outlets

To proceed with our market study, automobile passenger cars are the largest users of safety glass. In fact, the Automobile Industry, according to the Automotive Chamber of Commerce, consumed 68% of all plate glass sold in 1931 (54,000,000 square feet worth \$25,000,000). The attached Exhibit gives a list of cars, makes and models, using safety glass at the present time. Those marked "*" did not use it during 1930. It is interesting to note that the average amount used in a passenger automobile is 22 square feet.

Trucks and busses form another important outlet, armored trucks alone using an average of

25 square feet per truck with about 2,000 trucks in the country. The 1,000 cruisers produced by the boat industry last year used some 45 square feet of safety glass, while the 2,000 runabouts produced only used from six to eight feet per boat. Industrial goggles, while not representing a major outlet, nevertheless are looked upon as an important field for development, and at the present time are incorporating shatter-proof glass in 10% of the output.

A total compilation follows:

Passenger automobiles	8,700,000	square feet
Busses, trucks and taxis	6,500,000	" "
Armored cars	50,000	" "
Boats	59,000	" "
Aircraft, goggles and misc.	20,000	" "

The above figures represent a total of 15,329,000 square feet of glass, consuming 2,189,000 pounds of pyroxylin sheeting which, at an average price of \$.60 per pound, represents \$1,313,400 business.

It is evident that both the producer and the consumer have dropped prices below what they should be to give a reasonable profit. As against the 1929 statement of Mr. Higgins of Pittsburgh Plate Glass that the price at that time was \$2.50 per square foot in quantities, we find an average price today of about \$.80. The pyroxylin has been sold as low as \$.45 per

pound, considerably below cost, and since about one million dollars was spent previous to 1930 to perfect this material, according to Mr. B. W. Doyle, a higher price not only seems warranted but essential.

The 2,189,000 pound figure given above represents 18.416% of the domestic sheet production for that year, and after deducting the imports given earlier in this article we find that the total is further reduced to 2,131,634 pounds or 17.934% of the production.

Conclusion

The reader can see, therefore, that while this is indeed a major market it certainly does not consume the quantity most people suppose. It is the type of market, however, which responds most readily to the influence of normal times, and it can be regarded in the light that as automobile production rises it will gain further importance. Other fields, such as railroad cars, banks and even homes are being developed for future business, for the product is ideally suited to these outlets, and it is unquestionably true that once these are established, the safety glass industry will fulfill the promise that its prophets have foretold for it.

EXHIBIT 1

Non-Shatterable Glass

Used as Factory Equipment on 1932 Passenger Cars

Name and Model	Make of Glass	Equipment
Cadillac, all	Libbey-Owens-Ford	Throughout
Chrysler Imp. 8	Pittsburgh	Throughout
*Du Pont	Pittsburgh	Throughout
Ford, all	Libbey-Owens-Ford	Windshield
Franklin, all	Libbey-Owens-Ford	Throughout
Graham, all	Libbey-Owens-Ford	Throughout
Hudson, all	Pittsburgh	Windshield
La Salle, all	Libbey-Owens-Ford	Throughout
Lincoln, all	Libbey-Owens-Ford	Throughout
Marmon 8.79, Big 8, 88, 16.	Pittsburgh	Throughout
Packard, all	Libbey-Owens-Ford	Throughout
Peerless, St. 8	Pittsburgh	Windshield
Mas. 8., Cus. 8.	Pittsburgh	Throughout
Pierce-Arrow, all	Pittsburgh	Throughout
Studebaker Com. 70, Pres. 80, Pres.90.	Libbey-Owens-Ford	Throughout
*Rockne	Libbey-Owens-Ford	Throughout
	Pittsburgh	Throughout
Reo 25, 30, 35	Libbey-Owens-Ford	Throughout
Stutz, all	Libbey-Owens-Ford	Throughout
*Willys	Libbey-Owens-Ford	Throughout
*Willys-Knight		Windshield (25)
*Nash	Libbey-Owens-Ford	Throughout
*Dodge	Pittsburgh	Throughout

Are You Going Up?

By Allan Brown

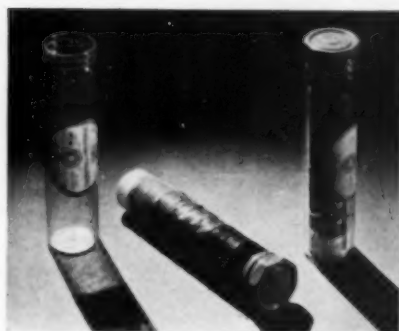
Advertising Manager, Bakelite Corp.

THE title of this article "Are You Going Up?" is a challenge, if you will, to the present state of mind. According to many leading authorities, this state of mind is the greatest obstacle we are now facing. We have been going down long enough. It is about time we changed the direction.

Good times always follow hard times, as surely as day follows night. Prosperity always comes back. America has beaten 19 major depressions, and she will beat this one. For three long years, business has been on the decline, but what most people overlook is that the extent and depth of this decline is creating conditions that cannot help but lead to a period of tremendous business activity. Stocks are depleted, shelves empty, machinery obsolete, all these things must be replaced.

We overlook the fact that every year, among 100,000 Americans, there are 2,083 children born that need clothing, food and other necessities; that 333 graduate from high school; that 1042 brides begin housekeeping and 1042 young husbands begin spending money for life's essentials. 1666 families move into other homes or apartments. New consumers are being created, new markets established, new desires that demand fulfillment.

And during these three long years, the creative minds of science and industry have been exceptionally active. New developments are just around the corner that will have a tremendous effect on agriculture, the



A product that does "go up"! Bakelite caps a non-breakable vial for spools of thread.

railroads, the automobile, the airplane, the building industry and many others.

In a recent address, Floyd Parsons, nationally known business editor, summarized some of these developments. For example, the use of carbon-dioxide gas for making sub-zero ice. This new refrigerant will permit the transportation of vegetables, fruits and other perishable goods to all parts of the globe. Think of its effect on widening the world's markets.

Startling New Products

There is the safflower, from which linseed oil can be produced. Today we supply but 40% of our annual consumption of linseed oil. Here is an opportunity for the farmers of our country to add to their income by planting thousands of acres of safflowers. We produce cotton for its lint value, but we have just begun to think of cotton for its cellulose value. In this form it can be used for the rayon market or as a substitute for wood pulp, thus providing a large revenue for the whole South. There is a shrub in Mexico called the guaco, from which synthetic rubber can be

manufactured. Already over a thousand acres of the guaco plant are under cultivation in Arizona. One large chemical firm is now making rubber out of limestone, coke and ordinary salt. Perhaps the day is not far distant when we will supply a large share of the rubber that we use. There is licorice for insulation boards; corn products for flavoring and perfumes; sweet potatoes for glue to improve the taste on the back of stamps and envelopes. These and dozens of other new developments forecast a bright future for the American farmer.

There will be lighter metals for automobiles. There will be smaller engines with more power. There will be more efficient fuels. Today we get but 8% of the total energy out of the fuel we burn in our automobiles.

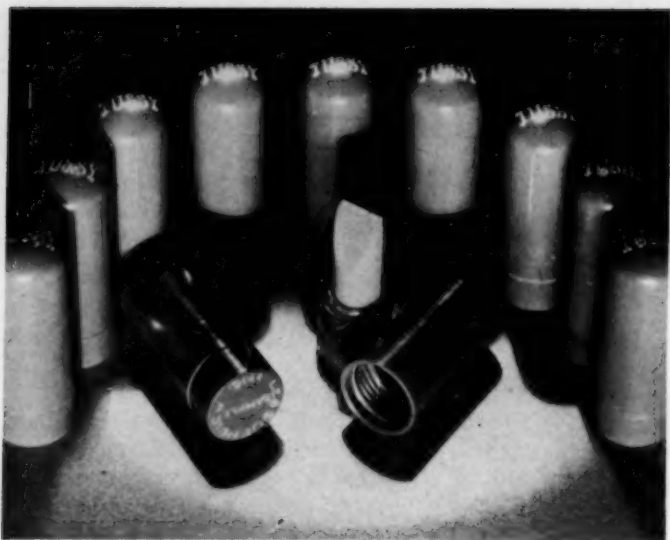
Through similar improvements the railroads will be able to run their trains at greater speeds and with greater efficiency.

There are improvements coming in water transportation. For example, a caterpillar tractor tow boat, which makes it possible to open up thousands of miles of shallow streams. There will be seadromes which will permit airplanes to travel over great areas of water in safety.

There are radical changes taking place in the building industry. Witness the steel construction of houses. Only a few weeks ago, ground was broken in Cleveland for a welded sheet steel house. Not only the initial cost of this house is less, but the upkeep is considerably lower than houses of present

(Continued on page 321)

Reprinted, by special permission, from the July issue of "Bakelite Review".



Durez and Plaskon combine green and ivory in this new Tussy lipstick, molded by Wheeling Stamping. Remember the old plastic lipsticks of four years ago? Well, this one just shouts to every woman—and the women buy them.



Here is a molded Bakelite boudoir clock, product of the Victor Electric Products Corporation. More and more clock manufacturers find the solution in a molded case.



The two molded boxes on the left show how important re-use is to-day. The top one was made for the Pioneer Suspender Company by Kuhn & Jacobs, and the lower one—keep your eye on the box!—is Hickok's. Both are Bakelite.



On your right, gentlemen, is something for these hot days—and for winter as well. A beautiful Durez thermometer, molded by Allen & Hills, and with a patented hook support in back. Neat?



The new model Boeing plane, pictured on the left, does not belong to Huidy. It does have two new features: Micarta pulleys and guides, and Lumarith running lights.



Another Bakelite display stand! This one has a device for locking the bottles in position, preventing spilling and pilfering. Yes, the plastic trade gets cleverer every month!



Here, above you, is the Masterhone, an instant sharpener for razor blades. Bonded with Bakelite resin, it is the ideal thing for travelling.





Handy, colorful Durez rouge boxes, just designed and molded by Colt's, are now ready for the shopper's purse. The same purse, probably, that holds the lipstick across the page.

A molded closure for the industrial field? That is what this Nuodex bottle has. The stuff inside is a catalyst for the paint laboratory, and the Durez cap matches the color of the contents.



The industrial buyer will find many suggestions on these pages. His product, too, may be better in plastic materials.

Molded Insulation Company has turned out a smart new Bakelite flower pot, pictured on the right. This type of pot keeps its color and is less breakable.

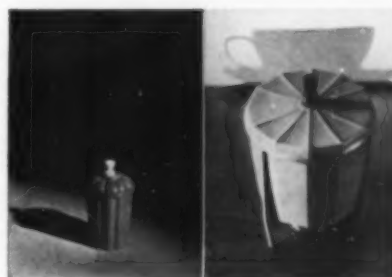


The Auburn Button Works thought that Durez was the material for this Terri compact. It comes in all sorts of colors, with an unbreakable mirror, and has a small silhouette on the cover. Whoops!

A smart smoking set from Europe, incorporating Bakelite Molded, matches color throughout. The case has a hidden hinge.



From Germany come the sugar and pepper dispensers. The button at the top ejects the contents as desired. Colored Bakelite prevents tarnishing, too.



If you must gamble, try this Bruhn & Elwert molded Bakelite roulette wheel and chips. It was designed for home use, but you see them at the office now-days!



Styling the Toilet Set

Modern Designers Beautify by Capitalizing
Feminine Fashion Trends

By F. J. Byrne

DuPont Viscoloid Company

IT has become apparent during the past several years that the field for cultivating beauty in pyroxylin is almost limitless. As men have worked in this comparatively new plastic and have begun to regard it not as an imitation, but as a material with qualities and characteristics of its own, it has become evident that if a technique were developed to suit the particular nature of the product, the potentialities of developing a very special beauty and dignity were immense. For a long while pyroxylin plastic was handicapped because it was regarded as an imitation or substitute. It is true it was developed as a substitute for ivory, but, like so many other substitutes, it soon found a place due to its own merit.

The rise of the pyroxylin family to high favor, displacing certain natural products, is well known. Its success has been due to special, inherent qualities. Duco is a pyroxylin product. It has made possible color, durability and decoration in a way never possible to the old style paints and varnishes. Lacquered fabrics have a pyroxylin coating. They have revolutionized many of the fields formerly occupied by the textiles and natural grains because they have surpassed them in their peculiar adaptability to the uses for which they were properly employed. Pyroxylin plastics, together with the other members of the pyroxylin family, are winning a firmer place in public regard, due to the fact that they have qualities which cannot be found in natural materials in the same field.

Men have always worked in plastics. Ivory has been the greatest of them and many exquisite works of art have been created in it. Imagine, though, what the old masters could have done with a pyroxylin plastic. Malleable, pliable, capable of being worked with almost any tool; with an exquisite affinity for color, so delicate in fact that any shade can be reproduced. In addition, it can receive any imprint, can be made to glow, become iridescent and lustrous. can reproduce any sheen created by the talents of man. If properly made, it is so durable that it will last for generations; it can take any decoration—medallion, metal, or even textile. There hardly seems a quality necessary to create beauty which is not inherent in this modern, man-made plastic.

Material All Important

Perhaps the greatest attention to beauty in pyroxylin plastic today is being given to the creation of boudoir accessories. This is quite natural because it is impossible to imagine a woman without a set of these articles so necessary to the maintenance of her high standards of personal appearance. Again, boudoir accessories must be especially appealing since they occupy so prominent a place on the dressing table, last so long, and become such an intimate part of the atmosphere which a woman creates. They must correspond with her personal desires, must match the decoration of her boudoir, and even be a factor, in some cases, in the architectural outlines of the room.

In creating something to fit these requirements, the artist

working in the finest types of pyroxylin today makes sure first that his material is of the very finest—any blotch, blemish, mark or stain instantly unfits it for acceptance. So important is this point that at least one company insists on it to the point of giving an absolute guarantee with each one of its high grade articles—money back if the material is not perfect. The mechanical side of the creation must also be perfect—every added product, such as glass and bristles, the best that nature or art can produce. These things provided for, the artist begins his creative task of selecting colors and designs. During the past several years some of the period designs placed on the market have attracted country-wide attention because of the fidelity with which they have been reproduced. Later, floral designs have made their appearance. In these, nature has not only been imitated, but interpreted. Colors as true as those tinting the natural blossoms have been reproduced in shades that will never fade. In matching these colors, the artist has been able to use Mother Nature herself as a teacher, since the pyroxylin material permits a range as great as that of the spectrum.

Novel Patterns Created

For the first time recently it has been attempted to create a textile pattern. Old lace was chosen and even the delicate tracery of the thread lines in the weave were successfully portrayed. This brings to the dressing table a new and essentially feminine design in decoration. It also works a de-

(Continued on page 316)

Physical Properties of Formaldehyde

By Dr. Frederic Walker

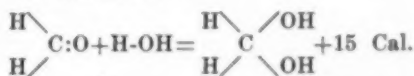
Chemical Control Section, The Roessler & Hasselacher Chemical Co., Inc., Perth Amboy, N. J.

FORMALDEHYDE, a key chemical in the manufacture of resins and plastics, has been in use for a great many years. The commercial products, a water solution of Formaldehyde and its solid polymer, Paraform or Paraformaldehyde, are familiar to all manufacturers of plastics. Few, however, are entirely familiar with the unique physical properties of these forms. Very little appears in American literature; in fact, most of the information on the physical chemistry of these products can be found only in German chemical journals. With these facts in mind this article has been prepared. It summarizes in convenient form, for American readers, that portion of Formaldehyde chemistry which is of practical importance to those who make use of this chemical.

Formaldehyde Solutions

Formaldehyde solutions are not simple solutions of a soluble gas in water. They have a more complicated composition because formaldehyde forms a series of compounds with water $(\text{CH}_2\text{O})_n\text{H}_2\text{O}$, and the aqueous solution contains a mixture of these compounds. The proportion of the various compounds present is determined by the temperature and concentration of the solution. Its physical properties are not those of a solution of a gas in water. Further, since these water-formaldehyde compounds are comparatively unstable, the solution behaves as though it were a solution of formaldehyde as far as most of its chemical properties are concerned.

The study of the physical properties of Formaldehyde solutions has shed considerable light on this subject and taken together with certain chemical evidence has made it possible to prove not only the existence of these hydrates but their chemical structure as well. It is now known that the simplest member of this group of compounds is Methylene Glycol, the unstable first member of the group of organic chemicals known as glycols. It is formed by the addition of one molecule of water to one molecule of formaldehyde, a reaction which has a heat effect equivalent to 15 kilogram calories. The Chemical equation for this reaction is shown below:



Identification of Methylene

The proof of the Methylene Glycol structure is based largely on certain spectral measurements. If ultra violet light is passed through a quartz prism the light waves are spread out in a continuous spectrum which may be easily photographed. If, however, the same light is passed through a chemical solution before it is sent through the prism, some of the light is absorbed and there are dark lines in the spectrum which show just which part of the light has been removed. This is known as an absorption spectrum. Physicists have found that the absorption of certain definite "colors" or wave lengths of light is due to the types of bonds or linkages between the atoms in the molecules of the chemical or chemicals through which the light has passed. Now

formaldehyde has in its molecules a carbon atom which is joined to an oxygen atom by two bonds and when this particular linkage is present in the molecules of a compound whose absorption spectrum is taken a certain definite wave length of light is absorbed and a dark line corresponding to this wave length of light is produced in the spectrum. This line is not found in the absorption spectra of aqueous solutions of Formaldehyde. Hence it follows that Formaldehyde is not present as such in the solution and the most likely alternative is that the dissolved Formaldehyde has combined with water in the solution and has gone over to Methylene Glycol which does not contain double bonds in its molecule.

The Raman spectra which was discovered in 1928 by an Indian chemist, Sir Chandrasekhara Raman, has enabled chemists to determine the chemical structure of compounds by means of another sort of spectral measurement. The study of the Raman spectra of formaldehyde solutions checks the absorption spectra measurements and has also shown that Formaldehyde solutions are in many ways similar to solutions of Ethylene Glycol, the best known member of the Glycol family. This physical evidence is borne out by the fact that although Methylene Glycol cannot be isolated itself, many of its simplest derivatives can be easily prepared in a pure state, e. g., the Methyl ether, Methylal, $\text{CH}_2(\text{OCH}_3)_2$ and the acetic ester, Methylene Acetate, $\text{CH}_2(\text{COOCH}_3)_2$. When deriva-

tives such as these are hydrolysed, formaldehyde solutions are obtained.

Polymethylene Glycols

Just as the lowest members of the series of formaldehyde-water compounds has been shown to be Methylene Glycol, the higher members have been shown to be Polymethylene Glycols. These compounds are analogous to the Polyethylene Glycols which are prepared from Ethylene Glycol. Their chemical structure is indicated by the following representative formulas:— $\text{HO}\cdot\text{CH}_2\cdot\text{O}\cdot\text{CH}_2\cdot\text{OH}$, $\text{HO}\cdot\text{CH}_2\cdot\text{O}\cdot\text{CH}_2\cdot\text{O}\cdot\text{CH}_2\cdot\text{OH}$, etc.

The presence of these compounds in solutions of formaldehyde has been detected by molecular weight measurements. This has been done by determining the lowering of the freezing point of water when it contains dissolved formaldehyde, since the average molecular weight of the dissolved molecules can be calculated from these measurements. Such work has shown that in dilute solutions (containing 1 to 5 percent by weight of formaldehyde) practically all the formaldehyde is in the form of the monohydrate, Methylene Glycol, whereas in the more concentrated solutions (containing 30 to 40 percent) polymethylene glycols having as many as five or six formaldehyde units per molecule may be present.

The proportion of the higher polymethylene glycols increases when the temperature of the solution is lowered. The compounds are present in a state of equilibrium which is definite for every temperature and concentration. The attainment of this equilibrium, however, is slow at temperatures of 25°C. or below and when the temperature or concentration of a solution has been changed, it required considerable time to reach the new state of equilibrium. For example, when a concentrated solution is diluted at room temperature, approximately 12 hours are required for the higher polymethylene

glycols to go over to the simpler forms. This can be demonstrated by measuring the freezing point of the solution when it has just been diluted and then measuring it again after 12 hours. The freezing point will be found to be much lower in the second measurement than it was in the first one.

Precipitate in Formaldehyde

The polymethylene glycols with the higher molecular weights are not so soluble in water as the lower ones, and like most chemical compounds their solubility decreases when the temperature is lowered. Furthermore as was mentioned above, the concentration of these compounds in a formaldehyde solution is increased at low temperatures. Accordingly when a formaldehyde solution is stored in a cold place it soon becomes supersaturated with these compounds and precipitation takes place. This accounts for the white precipitate which sometimes appears in solutions of formaldehyde.

Precipitation may be decreased by adding methyl alcohol to the solutions. This fact is made use of in the preparation of the usual U. S. P. formaldehyde solution which must contain at least 37% by weight of formaldehyde. A 37% solution containing sufficient methanol will remain clear at ordinary temperatures where as a solution containing no methanol would soon be filled with white precipitate. Now since this tendency to precipitate white solid is greatly increased at low temperatures, solutions that do not contain much methanol sometimes become cloudy after long storage in winter weather. Solutions fortified with relatively high concentrations of methanol are prepared to meet these conditions. If, however, the methanol concentration is low and clouding takes place, the solution can often be cleared up by placing it in a warm location for a few days. If this is not done promptly, the precipitated hydrate may lose some of its combined water, and it then be-

comes very difficult to clarify the solution.

Since U. S. P. formaldehyde solutions, although they always contain 37% by weight of formaldehyde, contain varying concentrations of methanol, it is not possible to determine their concentration by the measurement of their density. For example, the following solutions all contain approximately 37% formaldehyde but differ in methanol concentration and density.

Formaldehyde Concentration	Methanol Concentration	Density at 60°F.
37.2%	9.98%	1.093
37.2%	6.56%	1.101
37.2%	0.00%	1.116

The concentration of a formaldehyde solution should be determined by means of the alkaline-peroxide method described in the United States Pharmacopoeia.

According to U. S. P. requirements, formaldehyde solutions should not contain more acid per 20 cc. than can be neutralized by one cubic centimeter of normal alkali solution. This is equivalent to 0.21% of formic acid. High grade formaldehyde solutions are usually well below this limiting value in acidity. When acid or alkali is added to a formaldehyde solution, a white polymerized form of the aldehyde is precipitated. This precipitate is not very soluble in water and cannot as a rule be dissolved by warming. It is known as alpha-polyoxy-methylene.

Commercial formaldehyde solutions are often described erroneously as 40% solutions. By this is meant a solution containing 40% formaldehyde by volume. A 40% by volume solution contains 40 grams of formaldehyde per 100 cc. of solution and is equivalent in formaldehyde content to the 37% by weight solution.

Paraform

This solid form of formaldehyde which should contain not less than 95% of formaldehyde according to the U. S. P. requirements is made from the solution and is accordingly more expensive than the solution.

(Continued on page 326)

Casein

Its Preparation and
Technical
Utilization



By Robert Scherer

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RESINOX

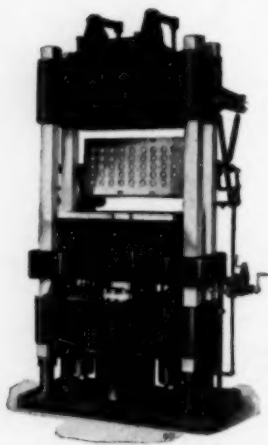
FOR MOLDING SUCCESS

On difficult jobs you will especially appreciate that there is a Resinox molding compound for every molding need, assuring you of perfectly molded parts, of lustrous beauty, and free from surface blemishes. Our technical staff will gladly assist you—in your own plant—with your molding problems. Resinox quality plus Resinox service spells molding success.

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French Hydraulic Machinery



A new tilting die molding machine, (patented). The die or die head tilts mechanically as the platen moves. The only hydraulic cylinders are the pressing and return cylinders. Rigid, accurate, reliable.

Several installations made in large plants.

We build all types of molding presses. Write for catalogs.

The French Oil Mill Machinery Company
Piqua, Ohio

New York

Pittsburgh

Akron

Chicago

STYLING THE TOILET SET

(Continued from page 312)

parture made possible to a new process, which once again proves the versatility of pyroxylin as a material capable of receiving all forms of art.

Then the material permits new forms of coloration. It allows for the imagination of the artist which selects not only flowers, blossoms, straight and curved lines, the charm of old furniture and the stateliness of ancient art conceptions, but even permits him to translate into matter the deep, lustrous lights and shadows found in the sea. Rolling, iridescent effects possible with no other medium. Translucent colors furnish background, the whole producing a harmony of color which hitherto only nature has been able to offer.

Perhaps it is in these newer effects that the great appeal of artistic conceptions in pyroxylin will lie. One of the artists engaged in creating new values in this material was asked what he was trying to express in one of his sets which had a contemporary design, based on the modern motif. "The thought of youth," he said, "freedom, self reliance, elimination of detail, the essentials only, directness."

Here we have a conception as striking as that of any old master. A delving into modern life and feeling to produce an article that depends on no old tried art method but is aimed directly at the feelings and emotions of today. At all events, the designs are better each year. They are more satisfying each year. And they are making a greater appeal.

THE British Standards Institution, the new name of the former British Engineering Standards Association, will shortly publish a British standard specification for moulded materials. This will be prepared by the newly-formed chemical section of the institution.

PLASTICS & MOLDED PRODUCTS

An Inexpensive Source of Pearl Lustre

Recovery of Crystals from Shells
is Described in a Recent Patent

ARTICLES finished with a pearl lustre, and plastics containing nacreous crystals so as to imitate mother-of-pearl, remain in favor. Most of these have been produced by the use of "pearl essence", which is, usually, a suspension of fine fish-scales in a solution of a cellulose ester or a resin.

Natural pearls, and the interior of most shells, contain a substance known as mother-of-pearl; which many have sought to imitate. In some of the older processes, the shells have been exfoliated by heat so as to separate the individual macreous crystals.

Eliminates Worthless Shells

A comparatively simple process has now been worked out by George A. Lippincott, of Philadelphia, who describes it in considerable detail in his U. S. Patent 1,812,885; July 7, 1931. We are indebted to the specifications of this patent for the following account of the process, which, incidentally, suggests the use of the product in plastics, Rayon and synthetic finishes and coatings.

Mr. Lippincott's invention relates to the treatment of pearl, mother of pearl shell, nacre and the shells of mollusks in general.

Microscopic tests reveal that these formations comprise layers of small wafer-like unicellular crystals of calcium carbonate each possessing a pearly luster and iridescence, the beauty of which is well recognized in the complete object.

They maintain their arrangement in a mosaic-like manner. The natural binder is a horny, organic substance having the

Editor's Note:

This summary of Mr. Lippincott's patent goes to considerable detail since we feel that interest in the subject warrants this treatment.

general properties of an albuminoid and is known as conchilin or conchiolin.

The problem is the recovery of the uni-cellular crystals and layers in the form of flakes possessed of their inherent qualities of iridescence and pearly lustre. Experiments have shown quite conclusively that the presence of the organic substance or binder has the effect of discoloring the flaked material prepared in accordance with previous methods, marring the brilliance of the final product and impairing its value.

For example where the crushed shell is subjected to heat in an oven for the purposes of exfoliation and to permit easier flaking, the conchiolin shrinks by virtue of the evaporation of its small moisture content and the recovered flakes are yellowed or blackened due to cooking, charring or carbonizing of the organic matter upon the flakes. Such flakes do not have their natural polish and for most purposes are worthless.

Process Before Heating

Bearing in mind, the nature of the material being treated, namely that the pearl, mother of pearl shell, nacre, and shells of mollusks in general are formed of layers of wafer-like crystals of calcium carbonate, with a small percentage, probably be-

tween 5% and 8% of organic matter, tenaciously binding or holding the crystals in a compact mosaic-like mass; the material is first preferably cleansed of any loose or clinging particles such as are usually found attached to raw stock of this character.

Thereupon the stock is given a preliminary grinding, this being desirable from the standpoint of allowing the treatment to be more effective and rapid and also because a better flaking is had with small particles.

The material is now placed in a vessel which can be sealed or in which a pressure may be built up and maintained, such as an autoclave, and covered with water.

Heat is then applied to the autoclave until the desired temperature and pressure are reached, and this condition is maintained so long as tests of the material show the presence of any appreciable amounts of undissolved organic matter.

Results

This treatment acts upon the binder to cause a breaking down or disintegration of the compact mosaiclike formation, and the separation of the crystals and layers. The conchiolin passes into solution leaving the flakes clean and lustrous and free from any of the effects of carbonization or burning.

When it has been ascertained that the mass of shell is substantially free of organic matter, the solution is run off and the shell recovered.

The shell so treated and recovered will be in the form of

(Continued on page 322)

NEWS of the INDUSTRY

Recent Changes

PLASTICS Publications, Inc., publishers of PLASTICS & MOLDED PRODUCTS, are now located in their new offices, Room 408 Graybar Building, 420 Lexington Avenue, New York, N. Y.

A. R. Haeuser Company manufacturers and importers of shellac, have moved to 52 Warren Street, Brooklyn, New York.

The Springfield Commercial Alcohol Company has been organized at Salt Lake City with W. T. Cannon as President. They will take over the assets of the Utah Industrial Alcohol Company and are capitalized at \$150,000.

L. V. Redman, Vice President, Bakelite Corporation, spoke at the recent annual meeting of the Canadian Chemical Association. Dr. Redman is President of the American Chemical Society.

Dr. L. F. Nickell, director of English interests for the Monsanto Chemical Company, has arrived in the United States for a visit to the main office in St. Louis.

The Richardson Company, it is reported, have put the molding plant at Chicago on an independent basis. Heretofore, this plant acted as a division of Richardson's Cincinnati headquarters.

Trade Association Activities

THE part trade associations may be expected to play in the changing economic and financial American business scene will be the central theme of a four-day convention of the American Trade Association Executives which will be held at the Hotel Ambassador, Atlantic City, Sept. 14-17, according to the program made public by W. J. Donald, chairman of the convention and program committee of the Association. Those attending the meetings—the thirteenth annual congress of the organization—will comprise executives from associations of every important industry in the

United States, according to Mr. Donald.

THE next meeting of the Molded Insulation Section of NEMA will be held at the new NEMA headquarters, 70 Lexington Avenue, New York City, on Friday, October 21st.

New York Representatives

THE regular monthly luncheon of the local representatives of custom molding companies was held at the Machinery Club, New York City, on Wednesday, July thirteenth. There were eighteen men present, representing fourteen companies.

The speaker at this meeting was Mr. R. E. Dodd of General Plastics, Inc. He explained the differences in various Durez molding compounds, and pointed out the possibility of developing several special compositions for molded parts that must fulfill extraordinary conditions. Mr. C. F. Landsheft of General Plastics was also available to answer questions regarding types of molding materials for particular jobs.

The next meeting of the group will be held on August 10th. at the regular meeting place, the Machinery Club.

BBRITISH imports of acetic acid and acetic anhydride showed improvement during the first quarter of 1932. Acetic acid imports of 3,205 tons valued at \$126,109 in the first quarter of 1932 were about 2½ times above the 1931 quarter figures of 1,301 tons, valued at £48,593. Incoming shipments of acetic anhydride likewise increased a trifle to 1,590 hundredweight (of 112 pounds) worth £4,840 from 1,545 hundredweight valued at £4,819 in corresponding periods.

New Bulletins

A NEW booklet announcing the Raymond small batch

mechanical separator has been issued by the Raymond Bros. Impact Pulverizer Co., Chicago, Ill. This equipment is especially suited for use in the manufacture or handling of powdered materials of all types.

The Lancaster Iron Works, Lancaster, Pennsylvania, issue bulletin No. 70 describing their electric batch mixers.

Complete data on dust collectors is given in a new booklet just issued by the Blaw-Knox Company of Pittsburgh, Pennsylvania.

Bulletin No. 01, issued by the De Walt Products Corporation, Lancaster, Pennsylvania, describes their new High Speed Cutting Machines for plastic materials. These are electrically operated and range from 4 to 15 H. P., and as high as 12' cutting capacity.

The American Cyanamid Company, New York, has released an illustrated thirty page pamphlet on Rezyls and Teglaes. This should especially interest our readers in the lacquer and varnish fields.

New NEMA Offices

BETWEEN August 15 and September 1, NEMA will move from its present quarters to more spacious offices at the RCA building, Lexington Avenue and 51st Street. The Association will occupy the entire 18th floor at the new location.

German Trade Opportunity

THE Bureau of Foreign and Domestic Commerce, Washington, D. C., has announced that a large firm in Hamburg, Germany, wishes to purchase pyroxylin waste, film scrap and rayon yarn waste. Those interested in dealing with this company should write to the Bureau asking for further information on Trade Opportunity Number 58457.

(Continued on page 323)

Are You Going Up?

(Continued from page 309)

construction. There is a market here for the steel industry of over three million tons. For several years, we have been running behind in the building of residences, at the rate of 270,000 houses a year. This does not mean apartment houses and office buildings in big cities. It means residential homes which should be constructed in the ordinary course of events to take care of the annual increase in population.

A regular network of pipe lines is being laid through the entire United States to transport oil and gas to the points of consumption. There are new developments in electronics, in radio, in television; new uses for oxygen; new types of tank cars; improvements in photography and sound pictures.

There are three million miles of roadway in this country and only six hundred thousand miles that are properly surfaced—another great market for labor and materials.

Then, last but not least, there are the plastic materials, a new and growing branch of American industry. Plastic materials are used in almost every line of business, and here, too, research has not been dormant. New or improved materials are constantly being introduced, opening up wider markets or bringing production economics to numerous manufacturers.

We are still the richest nation in the world—richest in raw materials, richest in our desire for new things, richest in the fertile ground for the cultivation of these things. Our greatest obstacle at the present time is our state of mind. A little leadership from those who have vision and confidence in the future of this country may turn the tide. That is why we ask "Are You Going Up?" Some companies have already started. There is still room for more on the first trip.



FORMALDEHYDE PARA FORMALDEHYDE HEXAMETHYLENAMINE

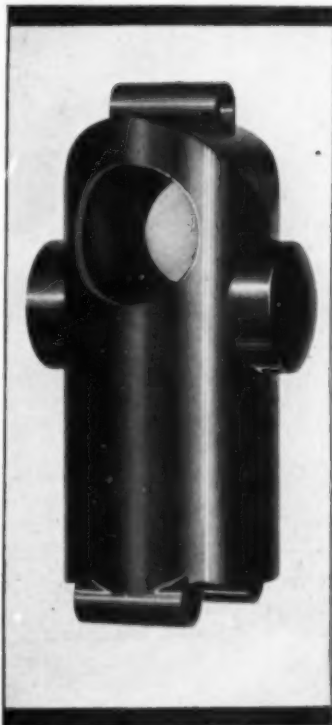
Long experience in the manufacture of these products enables us to meet the individual requirements of the Plastic Trade.

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Moldings
That Meet
Every Requirement
in
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Performance and
Economy

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PLASTIC MOLDING



Producers of the finest
in Molded Parts for
forty years



Shaw Insulator Co.
Irvington, N. J.



INEXPENSIVE SOURCE OF PEARL LUSTRE

(Continued from page 317)

flakes, composed of crystals or layers of crystals. Since the major portion of the binder has been removed, it will be clear that the larger flakes may be readily mechanically separated or crushed to the desired size.

The product is finally purified by washing with water with or without the addition of chemicals to remove the last traces of the organic matter. Reagents such as sodium hydroxide, potassium hydroxide, ammonia and alcohol may be used for this purpose.

The treatment is effective at a temperature substantially that of the boiling point of water, (100° C. more or less) and with normal atmospheric pressure (760 mm. more or less). Below these conditions there is some disintegration and solvent action but with a small temperature and pressure component treatment of any appreciable mass of material would be too slow.

Temperature Varies

For a rapid and complete treatment, a temperature varying from 184.5° C. to 215.5° C. and an accompanying pressure ranging between 10 and 20 atmospheres has been found satisfactory for a wide variety of materials. These computations are dependent upon the sizes and character of the pearl and shell and may be departed from as circumstances require.

For a great variety of materials it was found that crystals and layers free of organic matter except possible slight adhering traces may be obtained by processing the material for about two hours at 184.5° C. and 10 atmospheres. This is an average computed upon the basis of numerous tests.

After the treatment and final washing of the recovered ma-

(Continued on page 325)

PLASTICS & MOLDED PRODUCTS

NEWS of the INDUSTRY

(Continued from page 318)

More Foreign Trade Opportunities

THE Bureau of Foreign and Domestic Commerce, Washington, D. C., calls attention to the following commodities wanted: No. 242, Toronto, Canada, wants molded novelty lines as an agency; No. 389, Guantánamo, Cuba, is an agent looking for buttons and combs; No. 392, Sao Paulo, Brazil, wants to take the agency for pyroxylin calendars; No. 331, Basel, Switzerland, is interested in the purchase of phonograph records.

New Gasket Compound

NOT even oil at a high temperature will affect gaskets of a new substance that has been developed in the General Electric research laboratory at Schenectady. The exposed edge of the gasket is not attacked, nor does the oil penetrate it. Oil-filled assemblies have been operated on test at from 210 to 230 degrees Fahrenheit for a year without effect on the gasket and without leaks.

The compound may be used in contact with cemented joints; neither dilute acids nor dilute alkaline solutions affect the compound.

Designated as No. 1281 Gasket Compound, the material is a grey or brown, odorless and sulphur-free alkyd resin material, for which Glyptal is the G. E. trade name. It is flexible and practically incompressible, and there is no noticeable hardening or stiffening in outdoor exposure tests. At temperatures below zero Fahrenheit the compound is somewhat brittle, but this does not affect its efficiency as a gasket when assembled in a joint.

At present the material can be obtained in sheets up to 13 by 36 inches, in thickness from one mil to one-eighth inch.

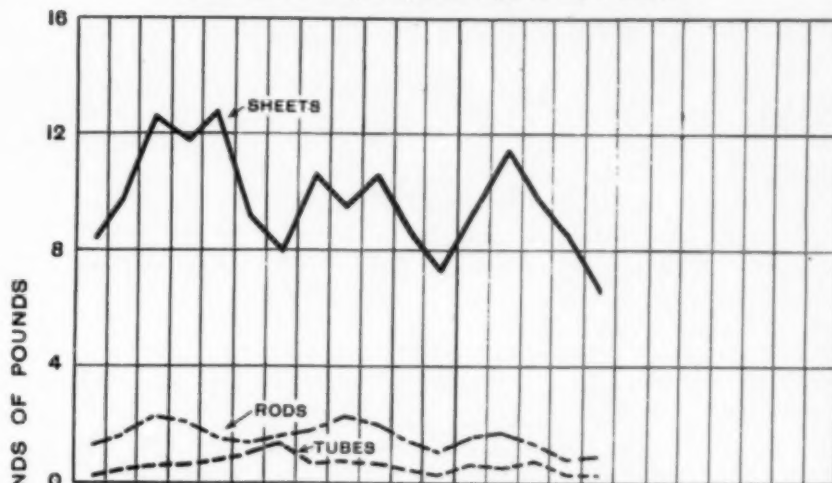
Round gaskets available at present have a maximum diameter of 12½ inches and a maximum

thickness of ⅛ inch, but larger sizes will be made available at a later date.

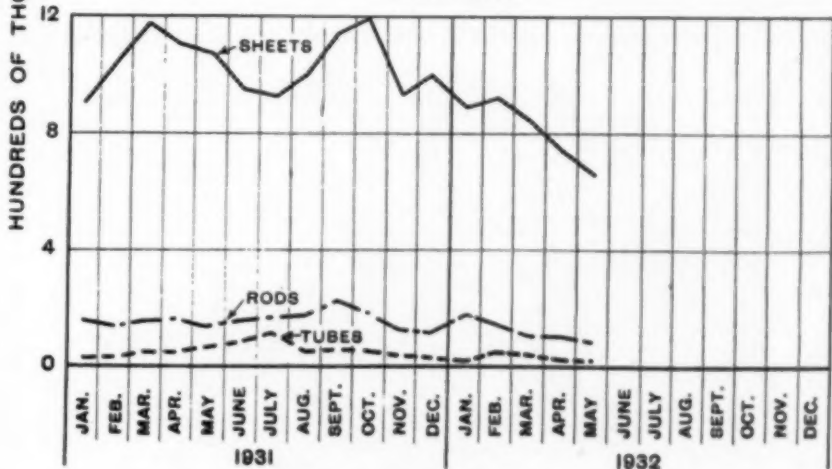
Pyroxylin Film Produced in Japan

DAI Nippon Celluloid Co., Ltd., outstanding Japanese producer of pyroxylin plastics,

Government Pyroxylin Figures To Date



SHIPMENTS



PRODUCTION AND SHIPMENTS IN POUNDS

	1932*					1931	Total 5 months (January-May)	
	January	February	March	April	May	May	1932	1931
SHEETS:								
Production...	931,485	1,148,598	968,977	851,145	859,088	1,285,838	4,559,227	5,566,471
Shipments....	890,221	928,066	845,550	743,698	664,585	1,072,066	4,072,180	5,303,778
RODS:								
Production...	145,145	159,290	132,430	80,863	85,879	160,727	603,607	689,763
Shipments....	171,619	144,530	101,513	104,662	84,635	134,293	606,959	747,086
TUBES:								
Production...	56,828	43,509	69,358	29,723	22,795	68,881	222,207	254,710
Shipments....	23,431	44,030	43,739	24,070	20,771	63,588	156,041	213,086

*Revised

is reported as having begun the production of motion picture film at their Tokyo plant. Encouraged by preliminary runs, a separate company will be formed with new capital. The new enterprise has the government's support for military reasons and it is expected that the Japanese company will take its place in the world's film market, within the next two years, alongside Eastman, Agfa, Pathé and others.

PLASTICS materials at the Paris Fair (Foire de Paris) recently held at the French capitol were, as usual, represented mostly by toys and novelties. The largest French exhibitors were Societe Nobel and Petitcollin. The Japanese display was on a much smaller scale than previous years.

Certain lines of novelties, especially dolls, showed much improvement this year. Dolls with closing or moving eyes, some of them fitted with a

squeaker and as elaborately jointed as the most expensive lines, were in evidence. For these dolls, a material without lustre is used, with an appearance like the "bisque" or French porcelain doll.

Petitcollin also had a number of plain toilet sets. The newest models were of plain material, but of geometrical shapes and rather thick, some of them having bevelled edges.

Nacrolaque was in evidence for musical instruments such as concertinas, drums and for radios.

One exhibitor showed a rather ingenious model of clasp or frame for handbags. Some of these were made of metal, but the majority were of plastic materials.

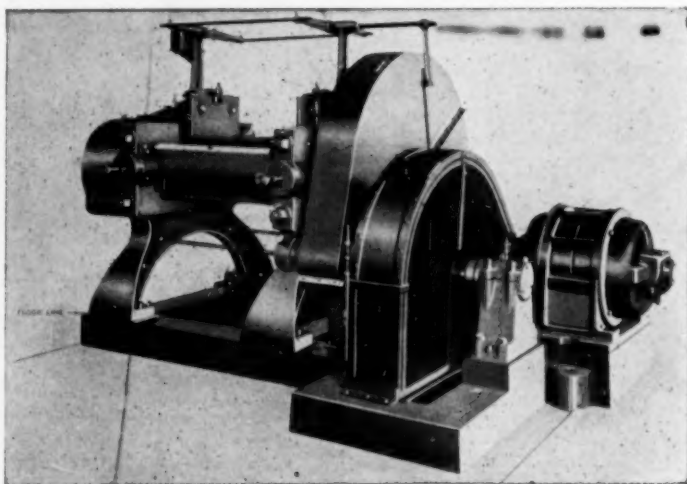
The third annual Packaging Exposition will open in the Hotel Pennsylvania, New York, March 7, 1933, for a four day display of the latest advances in

the technique and economics of modern packaging, packing and shipping, under the auspices of the American Management Association, according to an announcement by Irwin D. Wolf, Secretary of Kaufmann Department Stores, Inc., Pittsburgh, and chairman of the packaging exposition council of the Association.

The headquarters of the Exposition, Mr. Wolf announced, are the same as for the two previous shows, at 225 West 54th Street, New York City, with Roberts Everett Associates acting as exposition management. Last March 85 companies exhibited and the attendance exceeded 6,000, with more than 100 newspapers and trade magazines carrying news of the event.

The American Management Association, sponsors of the conferences, clinics and exposition, includes some of the country's most outstanding executives in its membership, and serves as a non-profit making clearing house for information of business management methods and accomplishments.

Sam A. Lewisohn, vice-president and treasurer of the Miami Copper Company, is chairman of the organization, and its president is William J. Graham, vice-president of the Equitable Life Insurance Society of the United States. Harry B. Gilmore, Secretary of the Western Electric Company, is treasurer and vice president. John G. Goetz, for twelve years assistant to the president of the National Industrial Conference Board, is Mr. Donald's successor as managing director. Mr. Kenneth B. Anderson is secretary of the Association.



14x30 rolls for plastic mixing

Following carried in stock: 6 x 16—10 x 24—14 x 30—16 x 42. Specially designed for mixing Durez, Bakelite, Asphalts, and Shellac Compound materials.

The largest and oldest manufacturers are using our machines.

WM. R. THROPP & SONS CO.

Established 1888

Trenton, N. J.

Editor's Note:

Other important news items will be found on page 334.

INEXPENSIVE SOURCE OF PEARL LUSTRE

(Continued from page 322)

terial, the flakes and layers may be graded to obtain uniform sizes. Such a separation of sizes may be made by suspension in water or any other suitable liquid. The larger layers or flakes if not required may be reduced to smaller sizes by running in a ball mill or by using an impact crusher, it being understood that removal of the conchiolin or natural binder renders the shell or pearl brittle and hence capable of easy flaking.

The recovered crystals or layers of crystals retain their natural polish and lustre and show no evidence of discoloration such as occurs when the organic matter becomes cooked, carbonized or burned. They may be easily treated when necessary to remove adhering matter and after being crushed when required are then ready for use.

Method of Application

The application of the flaked product to the making of reconstructed pearls and mother of pearl has been achieved with excellent results. The method simulates closely that of the pearl or mollusk and the final product possesses a beauty so nearly resembling the natural object that it is not easily distinguished.

For example by taking the flakes from which the conchiolin has been removed, and reducing them to desired size, it is possible, with the aid of a small quantity of a suitable binder replacing that removed, to apply the material as a coating with or without pressure to various objects.

For instance, pearls and pearly articles can be made by building up successive layers upon a small object after the manner of the pearl oyster, which in the

(Continued on page 328)

CELLULOSE ACETATE

TRIPHENYL PHOSPHATE

DIBUTYL PHTHALATE

DIETHYL PHTHALATE

ACETIC ANHYDRIDE

SODIUM ACETATE

CRESYLIC ACID

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for all purposes

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Hydraulic Operating Valves

Fig. 1 represents a valve for operating Semi-Automatic Presses for Hot or Cold Molding, using high and low water pressures and Relief, either with or without single or double "Pull-Back" cylinders. The operating lever can be placed in any position shown in Fig. 2.

Made in several sizes for use on large or small presses.

Also Angle, Globe and Pilot Valves of various sizes, Safety Valves, and Eccentric Quick-Opening Valves.

Hydraulic Fittings, Pressure Pumps, Accumulators, Steam Plates, Etc.

Our experience of over fifty years is at your service. Let us help you solve your pressing problems.



Fig. 1

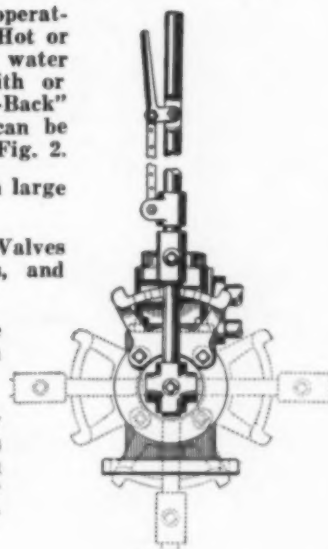


Fig. 2

Established 1872.

**The Dunning & Boschert
Press Co., Inc.**

330 West Water St., Syracuse, N. Y.

TECHNICAL ABSTRACT SECTION

A Review of Literature and Patents

Process For Reclaiming Dyed Film Scrap With An Alcoholic Solution of Sodium Peroxide. Charles E. Allen, Assignor to Eastman Kodak Co., of Rochester, N. Y. U. S. P. 1,844,711; Feb. 9, 1932.

The process of removing dye from cellulose nitrate film scrap base which comprises treating the scrap with alcohol to which sodium peroxide has been added.

The process of removing dye from cellulose nitrate film scrap base which comprises removing the silver halide emulsion from the film base and then hydrolyzing the surface of the base with an alcohol solution to which sodium peroxide has been added.

Process For Precipitating Cellulose Acetate. Samuel E. Sheppard and Leon W. Eberlin, Assignors to Eastman Kodak Co., of Rochester, N. Y. U. S. P. 1,844,717; Feb. 9, 1932.

A process for the precipitation of cellulose acetate which comprises disseminating air into a solution containing cellulose acetate simultaneously with a liquid precipitant.

A process for the precipitation of cellulose acetate which comprises disseminating air into a solution containing the cellulose acetate simultaneously with the precipitation thereof by a precipitating agent containing an aqueous solution of a salt, the salt being soluble in the reaction mixture.

A process for the precipitation of cellulose acetate which comprises disseminating air into a solution containing cellulose acetate simultaneously with the precipitation thereof by a precipitating agent containing a saturated aqueous solution of sodium acetate.

Pyroxylin Composition Containing Aldol Dimethyl Acetal. Robert Calvert, assignor to Van Schaack Bros., Chemical Works, Inc., of Chicago, Ill. U. S. P. 1,848,105; March 8, 1932.

Manufacture of Phenol Formaldehyde Condensation Products. Alfons Ostersetzer and Franz Riesenfeld, Assignors to Pollopas Limited, of Nottingham, England. U. S. P. 1,858,168; May 10, 1932.

Example 1

100 parts by weight of crystallized carbolic acid are heated for about $\frac{3}{4}$ hour under reflux, with 300 parts by weight of 30% formaldehyde and 23.2 parts by weight of twice normal caustic potash solution. A strongly exothermic reaction then takes place. To the still hot solution are added 5.8 parts by weight of phthalic acid in alcoholic solution, the sediment becoming discoloured. Thereupon the whole is evaporated to the greatest possible extent until the material can

just be filled into moulds, and it is hardened at a temperature of 60-100° C. until the material becomes solid. In that way a very light coloured product of great strength and elasticity is obtained, the properties of which are substantially better than those of the known condensation products prepared with alkalis from phenols and formaldehyde, and this product may be more easily worked than the latter. It is more particularly distinguished by its not fading.

New Synthetic Resins From Crude Solvent Naphtha. Leo Rosenthal, Assignor to I. G. Farbenindustrie A. G., of Frankfort-On-The-Main, Germany. U. S. P. 1,857,333; May 10, 1932.

Example 1

200 parts of a crude solvent naphtha free from phenols and bases and boiling between 160-182° C. are diluted with 50 parts of xylene. Into the mixture heated to about 18-25° C. 2 parts of boro-fluoro acetic acid are dropped gradually with vigorous stirring. The temperature of the reaction soon rises to 60-65° C. Stirring is continued for about 7 hours, after which the reaction liquid is diluted with 50 parts of purified solvent naphtha and heated to 80-100° C. for $\frac{1}{4}$ to $\frac{1}{2}$ an hour with 15-20 parts of quick lime or barium oxide while stirring vigorously. It is then filtered from the precipitate and the unresinified portion is distilled off under suitable reduced pressure. A nearly colorless resin is obtained which begins to sinter at 149° C. It is readily soluble in aromatic hydro-

carbons and like the products, obtainable in accordance with the following examples, can be worked up with cellulose ethers, if necessary or desired with the addition of softening agents to valuable, plastic masses. When the polymerization of the crude solvent naphtha, above specified, is carried out in the known manner with sulfuric acid a yellowish brown resin is obtained, which melts at 110° C.

Self Hardening Bituminous Cement. Dozier Finley, of Berkeley, California, Assignor to the Paraffine Companies, Inc., of San Francisco, California. U. S. P. 1,813,992; July 14, 1931.

A cement comprising the product resulting from the combination of the following substances in substantially the proportions stated:

660 pounds asphalt
60 pounds asbestos fiber
100 pounds pulverized soapstone
80 pounds infusorial earth
300 pounds sand
and with a softening agent comprising a mixture of (a) and (b)
(a)
48.8 pounds asphalt
2.9 gallons turpentine substitute
10.7 gallons coal oil
(b)
73.1 pounds paraffine wax
3.6 pounds aluminum stearate
9.7 gallons coal oil

Resinous Condensation Product From Glycerol Ethers. Kenneth H. Hoover, of Deerfield, Illinois, assignor to Association of American Soap and Glycerine Products, Inc., a Corporation of Delaware. U. S. P. 1,853,049; April 12, 1932.

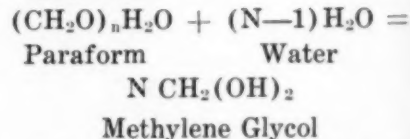
Physical Properties of Formaldehyde

(Continued from page 314)

However, the high concentration of formaldehyde and the solid form of this polymer give it many unique advantages.

Chemically paraform is a mixture of the highest members of the polymethylene glycol series. As was previously stated, the general formula for these compounds is $(\text{CH}_2\text{O})_n \cdot \text{H}_2\text{O}$. In paraform the average value of n in the formula lies between 11 and 12.

Paraform is slowly soluble in cold water and more readily soluble in hot water. In dissolving, its molecules break down to simpler ones. When a dilute solution is formed, the following reaction takes place:



By means of this polymer pure formaldehyde solutions of all concentrations can be easily prepared. It should be remembered, however, that highly concentrated solutions containing no methanol must be kept warm or they will precipitate polymethylene glycols. Paraform is very soluble in dilute alkali solutions and will also dissolve in hot alcohol. When heated in a sealed tube, paraform melts in the neighborhood of 120°-130°C. When it is heated in the air it is converted to formalde-

hyde gas. This fact is made use of when it is desired to employ the gas as a disinfectant.

When paraform was first prepared, it was wrongly called trioxymethylene. A German chemist, A. W. Hofmann, suggested this name in 1869 because the sulfur analogue of formaldehyde, thio-formaldehyde, was known to form a solid polymer whose formula was $(\text{CH}_2\text{S})_3$. This analogy was shown to be false in 1885 when an Italian, Pratesi, prepared the true trioxymethylene $(\text{CH}_2\text{O})_3$. This compound melts at 64°C , forms beautiful sparkling crystals and has an odor resembling that of chloroform. Since the name trioxymethylene had become generally used for paraform, Pratesi called the true trioxymethylene, alpha-trioxymethylene to avoid confusion. Even today paraform is often called trioxymethylene and given the formula $(\text{CH}_2\text{O})_3$. This is incorrect, for paraform is a mixture of polymethylene glycols having the general formula $(\text{CH}_2\text{O})_n\text{H}_2\text{O}$.

The higher polymers of formaldehyde, known as alpha-polyoxymethylenes contain 98—100% of formaldehyde in the polymerized form. They are only slightly soluble in water and are not very reactive. In a sealed tube they melt in the vicinity of 169°C . and above. As was previously stated, they can be prepared by the action of acids and alkalies on formaldehyde solutions.

Author's Note

For a more detailed discussion of the chemistry of formaldehyde solutions and polymers, the reader is referred to the following papers:—

"The State of Formaldehyde in Aqueous Solutions", Walker, Jour. Phys. Chem. 35, 1104-1113 (April, 1931).

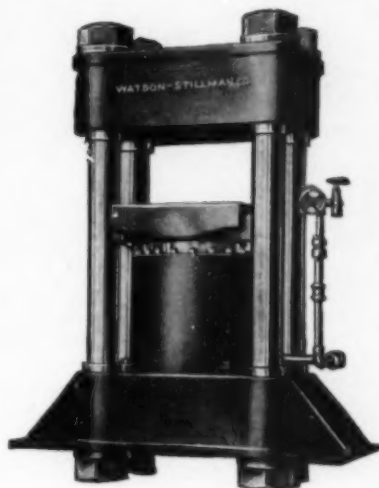
"Formaldehyde and Its Polymers", Walker Ind. and Eng. Chem. 23, 1220 (November, 1931).

A bibliography of the chemical literature on this subject will be found in these articles.

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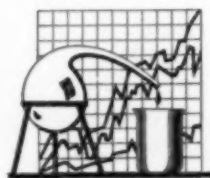
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(Continued from page 325)

case of a natural pearl, starts from a small body in the center and covers it with layers until the pearl is made up somewhat like the growth of an onion. The pearl thus made using an artificial binder, has an equal lustre over its entire surface as is characteristic of the natural object.

An article may be cast from the mass of the flakes and binder.

The method of reassembling the flakes is likewise important in the manufacture of pearl buttons and all kinds of pearl articles.

For example present methods requiring cutting and machining processes are expensive and the waste is enormous.

The flakes recovered by this process, can be finely pulverized and then molded with a suitable binder into various forms of buttons and pearl novelties. The saving is tremendous and the resulting product is even superior to the natural one, as color may be added or removed to give a variety of novel effects.

It should be borne in mind that the process contemplates an advantageous treatment of great quantities of material now ordinarily wasted. Thus in factories where the raw stock is cut and machined, a new field is open for the manufacture of valuable articles by utilizing the miscellaneous cuttings and scrap.

The flakes for instance can be incorporated in moldable compositions such as casein plastics, Bakelite, gelatin, agar agar and cellulose with very striking and attractive results. Such compositions may be shaped in a variety of forms as is well known.

It will therefore be seen that by flaking the material in accordance with the process, and

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molding after incorporating a suitable binder, there may be formed by means of a hydraulic press, the desired object without waste of material thereby eliminating the present crude, expensive and wasteful methods.

Many Varied Uses

The flakes or crystals in pulverulent form may be incorporated in paints, varnishes, lacquers and ornamental coatings of various characters. In the same manner, a clear vehicle having adhesive properties may be employed giving a delightful pearly effect.

Another use for the flakes or crystals is in the manufacture of a dentifrice. Tooth pastes and powders using mother of pearl have been unsatisfactory, due to the presence of the organic matter. The dentifrices so provided containing the pure calcium carbonate crystals can have no deleterious effect on the teeth.

The manufacture of artificial silk or "rayon" by the extrusion of viscose and cellulose compositions has become increasingly important.

Use in Paper

The finely pulverized flakes provide a desirable filler for paper and impart to it a sheen as well as serve to strengthen the texture. The powder may be added to the pulp in the beater or sprinkled upon the Fourdrinier.

In the case of wall paper, the pulverulent material may be incorporated in the pulp and may be sprinkled upon the paper in adhesive condition or the paper provided with a light adhesive coating.

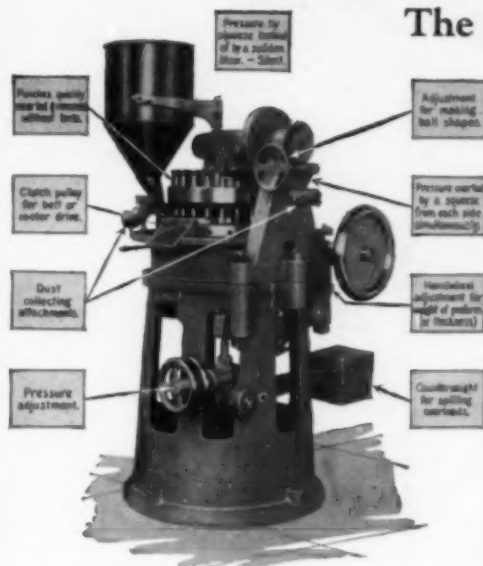
The flakes may be used in the arts after the same manner as aluminum and bronze powders, being ground to pass through a 300 mesh or finer screen as desired. The patent contains three process, and one product, claims.

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Advertisers' Index

American-British Chemical Supplies, Inc.	325	Jungmann & Co.	332
American Insulator Corp.	328	Kuhn & Jacob Molding & Tool Co.	320
American Record Corp.	321	Loomis Co., Evarts G.	320
American Plastics Corp.	306	Luxite, Inc.	336
Auburn Button Works, Inc.	332	Makalot Corp.	335
Becker-Moore Co.	333	Marblette Corp.	315
Boonton Molding Co.	332	Molded Insulation Section, NEMA	302
Burnet Co., The	333	Newark Die Co.	319
Calco Chemical Co.	301	Plastic Molding Co.	332
Cavagnaro, John J.	320	Recto Mfg. Co.	320
Chicago Molded Products Corp.	331	Resinox Corp.	316
Claremont Waste Mfg. Co.	333	Reynolds Spring Co.	332
Compo-Site, Inc.	332	Shaw Insulator Co.	322
Consolidated Products Corp.	331	Sherka Chemical Co., Inc.	328
Doerfler, L., Mfg. Co.	332	State Chemical Co.	333
Dunning & Boschert Press Co.	325	Standard Mirror Co.	333
Economy Ticket & Label Co.	333	Standard Machinery Co.	319
Esselen, Dr. G. J.	327	State Chemical Co.	333
French Oil Mill Machinery Co.	316	Stein-Brill Corp.	329
General Electric Co.	304	Stokes Machine Co., F. J.	329
General Plastics, Inc.	303	Thropp, Wm. R. & Sons, Co.	324
Heyden Chemical Co.	321	Watson-Stillman Co., The	327
Imperial Molded Products Corp.	332	Wheeler Co., The	319

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When we last saw him, he had purchased eight different types of compounds that he did not know how to handle; he had spent over \$2,000 in attempting to revamp his equipment; he had not picked a design, although he had seen many. *And he had just contracted with a custom molder, experienced in this type of work, for his entire production.*

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TRAGEDY has again struck the innocent . . . D. Gordon Wilson, head of the Chicago company bearing his name . . . and for over twenty years representative for American Record in the West . . . was shot and killed by a hold-up man while in Minneapolis on business . . . His sudden passing is a distinct shock to his many friends and business associates. . . .

SEE the ad by your right elbow? . . . well, Makalot now has R. L. McLaughlan, who for the past sixteen years has been with G. E. at Pittsfield . . . another clansman, Mr. MacDonough, who was previously with Arthur D. Little, now handles production for Luxite . . . plant at Canton, Mass. . . . must you see an ad? . . . or have you noticed the back cover? . . . The Chairman of the British Plastics Trade Association . . . Captain J. W. Barber . . . left England July 20 for a visit to the States . . . Welcome to him! . . . The old Johnson Molding & Tool Company has at last had its final bankruptcy hearing . . . Bakelite has appointed T. J. Major as Traffic Manager . . . Mr. Major will continue to act as General Purchasing Agent . . . They also announce changes in the varnish division . . . R. A. Brenneck going to Chicago . . . Howard Smith to Rochester . . . E. H. Gross to Hartford . . . and C. R. Given to New York . . . *In the machinery field* . . . A. M. Kahn, President of Consolidated Products, sailed on the Bremen July 28 for Europe . . . motive: pleasure and business . . . also M. I. Cowen, Secretary of Consolidated, sailed two days later

on the Clyde Line to Galveston, Texas, and will go from there to the West Coast . . . the motive is the same . . . (Speaking of Texas, Smith, of Aldur, is in Houston . . . pleasure only) . . . *In the custom molding field* . . . G. C. Wilson has resigned as Sales Manager of Norton Laboratories . . . Molded Plastics, Brooklyn, New York, (run by Snyder, formerly of Colt) is out of business . . . H. S. ("Old Bill") Spencer wrote a fine article for the June issue of Business Administration . . . Business has been picking up in the trade . . . some new jobs being: . . . Imperial Molded's use of Plaskon to replace the old mica Pullman shade . . . Norton Laboratory's beautiful job for Vantine rouge . . . this being a chainstore item . . . Others, seen at Woolworth's, are closures on the Loveland line . . . a new pyroxylin memo pad . . . and a salt and pepper set. Molded by Richardson, to compete with the one already on sale that was molded by Real Equity. . . .

FRANK SHAW'S many friends will be glad to know that he is on the road to complete recovery. He was taken with a severe attack of blood poisoning early in July and has since been confined to his bed, under the care of specialists and two nurses. While it will be some time before he can be allowed to receive visitors, and probably September before he can come out, letters from friends do much to cheer him. We urge them all to write him as often as possible, addressed to 192 Gregory Avenue, West Orange, New Jersey.

NICE letters from the fairer sex are few and far between. We blush to admit getting one lately from Lawrena H. Wilson of the Rorimer-

Brooks Studios, Cleveland. Enclosing some money, just to show how prosperous Cleveland really is, she goes on to say, "The field of business which your magazine covers is so broad that we find it of great interest even in the decorative field." So do others (including the Scandinavian), Miss, we hope, Wilson. But they don't say it in such a nice way!

FORMALDEHYDE, even to the layman, has long been regarded as the key chemical for the plastic trade. It is the basis of the majority of our modern materials, and its use is growing in importance. If only for this reason, we are pleased to present the exclusive article in this issue, "Physical Properties of Formaldehyde", which has been prepared by Dr. Frederick Walker. Dr. Walker, a graduate of M. I. T., has been connected with the Research Department of Roessler & Hasslacher for many years, and during the last few, has devoted the majority of his time to this particular subject. His hobby is the history of Chemistry, and he is the author of numerous papers that have appeared in the Journal of Chemical Education, Industrial & Engineering Chemistry, etc. While this present article reflects his technical knowledge and training, it also, as the writer of this page can testify, has distinct appeal to the aforementioned layman.

LET us again repeat that we are extremely sorry for the inconvenience caused our subscribers through the delay in our July number. It was unforeseen and unavoidable, but now that PLASTICS is settled in its new location, every effort will be made to adhere to the regular publishing date.

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